

III. REMARKS

A. Summary of the Amendments

The specification has been amended in order to correct certain minor typographical errors detected by the Applicant.

The present application now contains 26 claims.

Claims 1, 2, 6, 7, 17, 19, 21, 23, 24, 37 have been amended in order to better define the subject matter being claimed.

Claims 8-16, 18 and 25-36 have been cancelled from the present application, without prejudice. The Applicant reserves the right to pursue protection for these claims in a divisional application.

Claims 3-5, 20 and 22 remain the same

Claims 38-48 have been added to the present application. The Applicant respectfully submits that support for new claims 38-48 exists in the application as filed and that no new matter has been added to the present application.

B Summary of the Rejections and Reply

I) Rejection of claims 1-9, 15, 16 and 37 under 35 U.S.C. §102(b)

In the Office Action, the Examiner has rejected claims 1-9, 15, 16 and 37 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent no. 4,864,501 (hereafter to be referred to as Kucera et al.).

For the reasons presented below, the Applicant respectfully submits that independent claims 1, 6, 7 and 37, as amended, are novel in light of the teachings of Kucera et al.

Claims 1-5

The Examiner's attention is respectfully directed towards the following limitation of independent claim 1, as amended:

A natural language information extraction system for deriving information from a textual representation of a sentence, the sentence having a plurality of words, said system comprising:

- a) an input for receiving data elements indicative of the textual representation of the sentence;
- b) a processing unit coupled to said input, said processing unit being operative for processing the textual representation of the sentence to derive:
 - i. **a parse tree group including a plurality of parse trees and;**
 - ii. **at least one noun phrase associated to a semantic type;****said processing unit being operative for processing said parse tree group and said at least one noun phrase associated to a semantic type on the basis of a set of information extraction rules to derive an information record, the information record being indicative of a semantic representation of at least part of the sentence;**
- c) an output for releasing one or more data elements indicative of the information record.

The Applicant respectfully submits that the reference cited by the Examiner does not disclose, teach or suggest the above-emphasized limitations of independent claim 1. More specifically, the Applicant respectfully submits that Kucera et al. does not teach the limitation of a processing unit that is operative for processing a "parse tree group and said at least one noun phrase associated to a semantic type on the basis of a set of information extraction rules to derive an information record".

Instead, Kucera et al. describes a word annotation system that is operative to provide one or more "tags" to words in a sentence, wherein each "tag" describes a syntactic or inflectional property of the word. Once each word in the sentence has been annotated with a sequence of possible tags,

the tag set is input into a grammar processor that uses the annotated words to form a parse of the sentence. As such, Kucera et al. teaches a method of annotating words in order to provide an input for a sentence parser. Nowhere does Kucera et al. disclose processing parse trees in combination with a noun phrase associated to a semantic type to derive an information record. As such, Kucera et al. does not teach the above emphasized limitations.

In light of the foregoing, the Applicant respectfully submits that independent claim 1, as amended, distinguishes over the cited art, and as such is believed to be in condition for allowance.

Claims 2-5 depend from independent claim 1, and as such incorporate by reference all the limitations contained therein. Accordingly, for the same reasons as those presented above with respect to independent claim 1, claims 2-5 also distinguish over the cited art, and as such are also believed to be in condition for allowance.

Claim 6

The Examiner's attention is respectfully directed towards the following limitations of independent claim 6, as amended:

A method for deriving information from a textual representation of a sentence, the sentence having a plurality of words, said method comprising:

- a) receiving data elements indicative of the textual representation of the sentence;
- b) processing the textual representation of the sentence to derive:
 - i. **a parse tree group including a plurality of parse trees and;**
 - ii. **at least one noun phrase associated to a semantic type;**
- c) **processing the parse tree group on the basis of a set of information extraction rules and the at least one noun phrase associated to a semantic type to derive an information record, the information record being indicative of a semantic representation of at least part of the sentence.**

Independent claim 6 describes the method performed by the apparatus of independent claim 1. As such, for the same reasons as those presented above with respect to independent claim 1, the Applicant respectfully submits

that Kucera et al. does not disclose, teach or suggest the above-emphasized limitations of amended claim 6.

Accordingly, the Applicant respectfully submits that independent claim 6, as amended, distinguishes over the cited art, and as such is believed to be in condition for allowance.

Claim 7

The Examiner's attention is respectfully directed towards the following limitations of independent claim 7, as amended:

A computer readable medium comprising a program element suitable for execution by a computing apparatus for deriving information from a textual representation of a sentence, the sentence having a plurality of words, said computing apparatus comprising:

- a) a processor, said program element when executing on said processor being operative for:
 - i. receiving data elements indicative of the textual representation of the sentence;
 - ii. processing the textual representation of the sentence to derive:
 - (a) a parse tree group including a plurality of parse trees and;
 - (b) at least one noun phrase associated to a semantic type;
 - iii. processing the parse tree group and the at least one noun phrase associated to a semantic type on the basis of a set of information extraction rules to derive an information record, the information record being indicative of a semantic representation of at least part of the sentence;
- d) releasing one or more data elements indicative of the information record.

Independent claim 7 describes a computer readable medium comprising a program element suitable for execution by a computing apparatus for performing the method described in claim 6. As such, for the same reasons as those presented above with respect to independent claims 1 and 6, the Applicant respectfully submits that Kucera et al. does not disclose, teach or suggest the above emphasized limitations of amended claim 7.

Accordingly, the Applicant respectfully submits that independent claim 7, as amended, distinguishes over the cited art, and as such is believed to be in condition for allowance.

Claims 8, 9, 15 and 16

With regard to the Examiner's rejection of claims 8, 9, 15 and 16 in light of Kucera et al., the Applicant respectfully submits that claim 8, 9, 15 and 16 have been cancelled from the present application, and that as such, the Examiner's rejection is rendered moot.

II) Rejection of claims 17-24 under 35 U.S.C. §102(b)

In the Office Action, the Examiner has rejected claims 17-24 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent no. 6,275,791 (hereafter to be referred to as Weise).

For the reasons presented below, the Applicant respectfully submits that independent claims 17, 23 and 24, as amended, are novel in light of the teachings of Weise.

Claim 17

The Examiner's attention is respectfully directed towards the following limitations of independent claim 17, as amended:

An apparatus for parsing a textual representation of a sentence to derive a parse tree group including a plurality of parse trees, the sentence including a plurality of words, the apparatus comprising:

- a) an input for receiving data elements indicative of the textual representation of the sentence;
- b) a processing unit for processing the data elements indicative of the sentence to generate a parse tree group, said processing unit being operative for:
 - i. **generating a parse tree for each word in the sentence and adding each generated parse tree to the parse tree group, wherein each parse tree in the parse tree group is formed of at least one node, and wherein all of the nodes that form the parse tree are associated to a word in the sentence;**
 - ii. generating a new parse tree on the basis of binary dependency rules applied to a given parse tree in the parse tree group, the new parse tree resulting from a combination of the given parse tree and another parse tree from the parse tree group;
 - iii. adding the new parse tree to the parse tree group;
- c) an output for releasing a signal indicative of the parse tree group.

The Applicant respectfully submits that the reference cited by the Examiner does not disclose, teach or suggest the above-emphasized limitation of independent claim 17. More specifically, the Applicant respectfully submits that Weise does not teach “generating a parse tree for each word in the sentence...wherein each parse tree in the parse tree group is formed of at least one node, and wherein all of the nodes that form the parse tree are associated to a word in the sentence”.

Instead, as indicated in Figure 3, and column 9, lines 48-51, Weise teaches generating parse trees wherein the leaf nodes of the parse tree are associated to words, and the root nodes are associated to a syntactic relationship between those leaf nodes. Accordingly, Weise does not teach that “all of the nodes that form the parse tree are associated to words of the sentence”. Accordingly, Weise does not satisfy all of the limitations of amended claim 17.

The Applicant respectfully submits that as described in the background of the invention, the “majority of parsers use constituency syntax” wherein “a sentence is depicted as a tree where each node is labeled with the type of constituent (ex: noun phrase, verb phrase, etc.) and the leaves store the individual words of the sentence.”. The Applicant respectfully submits that this is the method described by Weise, which is not the method used by the present invention. Moreover, the present invention uses dependency syntax “where a sentence is depicted as a tree where all nodes and leaves are associated to words in a sentence and arcs in the tree are associated to data elements indicative of relationships between words (ex: subject, object, etc.).”

In light of the foregoing, the Applicant respectfully submits that independent claim 17, as amended, distinguishes over the cited prior art, and as such is believed to be in condition for allowance.

Claims 19-22 depend from independent claim 1, and as such incorporate by reference all the limitations contained therein. Accordingly, for the same reasons as those presented above with respect to independent claim 17, claims 19-22 also distinguish over the cited prior art, and as such are also believed to be in condition for allowance.

Claim 23

The Examiner's attention is respectfully directed towards the following limitations of independent claim 23, as amended:

A method for parsing a textual representation of a sentence to derive a parse tree group including a plurality of parse trees, the sentence including a plurality of words, said method comprising:

- a) receiving data elements indicative of the sentence;
- b) processing the data elements indicative of the sentence to generate a parse tree group by:
 - i. **generating a parse tree for each word in the sentence and adding each generated parse tree to the parse tree group, wherein each parse tree in the parse tree group is formed of at least one node, and wherein all of the nodes that form the parse tree are associated to a word in the sentence;**
 - ii. generating a new parse tree on the basis of binary dependency rules applied to a given parse tree in the parse tree group, the new parse tree resulting from a combination of the given parse tree and another parse tree from the parse tree group;
- c) adding the new parse tree to the parse tree group.

Independent claim 23 describes the method performed by the apparatus of independent claim 17. As such, for the same reasons as those presented above with respect to independent claim 17, the Applicant respectfully submits that Weise does not disclose, teach or suggest the above emphasized limitations of amended claim 23.

Accordingly, the Applicant respectfully submits that independent claim 23, as amended, distinguishes over the cited prior art, and as such is believed to be in condition for allowance.

Claim 24

The Examiner's attention is respectfully directed towards the following limitations of independent claim 24, as amended:

A computer readable medium comprising a program element suitable for execution by a computing apparatus for parsing a textual representation of a sentence to derive a parse tree group including a plurality of parse trees, the sentence including a plurality of words, said computing apparatus comprising:

- a) a processor, said program element when executing on said processor being operative for:
 - i. receiving data elements indicative of the sentence;
 - ii. **generating a parse tree for each word in the sentence and adding each generated parse tree to a parse tree group, wherein each parse tree in the parse tree group is formed of at least one node, and wherein all of the nodes that form the parse tree are associated to a word in the sentence;**
 - iii. generating a new parse tree on the basis of binary dependency rules applied to a given parse tree in the parse tree group, the new parse tree resulting from a combination of the given parse tree and another parse tree from the parse tree group;
 - iv. adding the new parse tree to the parse tree group;
 - v. releasing a signal indicative of the parse tree group.

Independent claim 24 describes a computer readable medium comprising a program element suitable for execution by a computing apparatus for performing the method described in claim 23. As such, for the same reasons as those presented above with respect to independent claims 17 and 23, the Applicant respectfully submits that Weise does not disclose, teach or suggest the above emphasized limitations of amended claim 24.

Accordingly, the Applicant respectfully submits that independent claim 24, as amended, distinguishes over the cited prior art, and as such is believed to be in condition for allowance.

III) Rejection of claim 25 under 35 U.S.C. §102(b)

In the Office Action, the Examiner has rejected claim 25 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent no. 5,060,155 (hereafter to be referred to as Van Zijlén).

The Applicant respectfully submits that claim 25 has been cancelled from the present application, and that as such, the Examiner's rejection is rendered moot.

IV) Rejection of claims 26, 27 and 29-36 under 35 U.S.C. §102(e)

In the Office Action, the Examiner has rejected claims 26, 27 and 29-36 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent no. 6,601,055 (hereafter to be referred to as Roberts).

The Applicant respectfully submits that claims 26-35 have been cancelled from the present application, and that as such, the Examiner's rejection is rendered moot.

V) Rejection of claims 10-14 under 35 U.S.C. §103(a)

In the Office Action, the Examiner has rejected claims 10-14 under 35 U.S.C. §103(a) as being unpatentable in light of Kucera et al. in view of U.S. Patent no. 5,794,177 (hereafter to be referred to as Carus et al.).

The Applicant respectfully submits that claims 10-14 have been cancelled from the present application, and that as such, the Examiner's rejection is rendered moot.

VI) Rejection of claim 28 under 35 U.S.C. §103(a)

In the Office Action, the Examiner has rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable in light of Roberts in view of Kucera et al.

The Applicant respectfully submits that claim 28 has been cancelled from the present application, and that as such, the Examiner's rejection is rendered moot.

C Summary of New Claims

Claim 38

The Examiner's attention is respectfully directed towards the following limitation of new claim 38:

A natural language information extraction system for deriving information from a textual representation of a sentence, the sentence having a plurality of words, said system comprising:

- a) an input for receiving data elements indicative of the textual representation of the sentence;
- b) a processing unit coupled to said input, said processing unit being operative for processing the textual representation of the sentence to derive:
 - i. **a parse tree group including a plurality of parse trees, wherein each parse tree in the parse tree group is formed from at least one node, all of the nodes forming the parse tree being associated to a word in the sentence, at least one parse tree including at least two words of the sentence; said at least one parse tree including a dependency data element describing a syntactic relationship between the at least two words of the sentence;**
said processing unit being operative for processing said parse tree group on the basis of a set of information extraction rules to derive an information record, the information record being indicative of a semantic representation of at least part of the sentence;
- c) an output for releasing data elements indicative of the information record.

The Applicant respectfully submits that none of the references cited by the Examiner disclose, teach or suggest the above-emphasized limitation of new claim 38. More specifically, the Applicant respectfully submits that none of the references teach a processing unit operative to derive "a parse tree group including a plurality of parse trees, wherein each parse tree in the parse tree group is formed from at least one node, all of the nodes forming the parse tree being associated to a word in the sentence".

As described above with respect to independent claim 17, although Weise teaches generating parse trees, Weise does not teach that "all of the

nodes forming the parse tree" are associated to words of the sentence.

In light of the foregoing, the Applicant respectfully submits that new claim 38 distinguishes over the cited prior art, and as such is believed to be in condition for allowance.

Claim 39

The Examiner's attention is respectfully directed towards the following limitation of new claim 39:

A natural language information extraction system for deriving information from a textual representation of a sentence, the sentence having a plurality of words, said system comprising:

- a) an input for receiving data elements indicative of the textual representation of the sentence;
- b) a processing unit coupled to said input, said processing unit being operative for:
 - i. generating a parse tree group including a plurality of parse trees, at least some parse trees including at least two words and a data element indicative of the syntactic dependencies between the at least two words;
 - ii. generating on the basis of the parse tree group a plurality of lexical frames, each lexical frame being associated to a respective word in the sentence, a certain lexical frame being associated to a certain word in the sentence and comprising a list of words of the sentence other than the certain word, each word in the list of words being associated to a dependency data element indicative of the syntactic relationship of each word in the list of words with the certain word;
 - iii. **processing said plurality of lexical frames on the basis of a set of information extraction rules to derive an information record being indicative of a semantic representation of at least part of the sentence;**
- c) an output for releasing data elements indicative of the information record.

The Applicant respectfully submits that none of the references cited by the Examiner, taken either individually or in combination, disclose, teach or suggest a natural language information extraction system that includes a processing unit operative for generating a plurality of lexical frames on the basis of a parse tree group, and processing the plurality of lexical frames on the basis of a set of information extraction rules in order to derive an information record indicative of a semantic representation of at least part of the sentence. As such, the Applicant respectfully submits that new claim 39

distinguishes over the prior art references cited by the Examiner, and is in condition for allowance.

Claims 40-48

The Applicant respectfully submits that new claims 40-48 relate to previous claims 26-36, which have been made dependent on new claim 38.

The Applicant respectfully submits that claims 40-48, which are now dependent on independent claim 38, incorporate by reference all the limitations contained therein, including the following limitations which have already been shown to distinguish over the prior art cited by the Examiner.

a parse tree group including a plurality of parse trees, wherein each parse tree in the parse tree group is formed from at least one node, all of the nodes forming the parse tree being associated to a word in the sentence,

Accordingly, the Applicant respectfully submits that claims 40-48 are believed to be in condition for allowance, as being dependent on independent claims 38.

III. CONCLUSION

In view of the above, it is respectfully submitted that claims 1-7, 17, 19-24 and 37-48 are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance of claims 1-7, 17, 19-24 and 37-48 at an early date is solicited.

If the claims of the application are not considered to be in full condition for allowance, for any reason, the Applicant respectfully requests the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims or in making constructive suggestions so that the application can be placed in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,



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